

Frontiers, Machines, and the Illusory Garden

For if the West ‘of myth and symbol,’ in Henry Nash Smith’s apt terms, provided one perspective by which Americans might view their society, the machine provided another. The two images fused into a single picture of a progressive civilization fulfilling a providential mission.¹

With this passage, historian Alan Trachtenberg lays bare two fault lines running the length and breadth of the better part of America’s national history. Beginning with eighteenth-century farmers and trappers eager to seek their fortunes on the Trans-Appalachian Frontier, Daniel Boone’s epic plunge into the wilds of Kentucky in 1784, the Corps of Discovery’s daring sprint to the Pacific Northwest two decades later, and the subsequent passage of hundreds of thousands of settlers across the Great Plains in search of California gold and the rich loams of the Willamette Valley, the unbounded West has long occupied a central part of the American experience.² “Manifest Destiny,” an all-encompassing paradigm of Western settlement, encouraged “Anglo-Saxon America ‘to overspread and to possess the whole of the continent which Providence had given us for the development of the great experiment of liberty,’” according to journalist John L. Sullivan.³ But along with the frontier mythology that arose from tales of cowboys singing great herds of longhorns to sleep on the open prairie, and the sprawling tracts of farmland that awaited white men and women brave enough to pour their life savings into a mule team, came a parallel ideology of industrial progress. The churning paddlewheels of inland riverboats ferrying grain and timber to cities, and the puff and whistle of newfangled

¹ Alan Trachtenberg, *The Incorporation of America: Culture & Society in the Gilded Age* (New York: Hill and Wang, 1982).

² Carolyn Merchant, *The Columbia Guide to American Environmental History* (New York: Columbia University Press, 2002), 80.

³ Carolyn Merchant, *The Columbia Guide*, 82.

locomotives bound for Sacramento resonated in profound ways with America's emerging capitalist psyche.

When Trachtenburg speaks of such images fusing “into a single picture of a progressive civilization fulfilling a providential mission,” readers ought not assume he means such a glorious society actually materialized. Ultimately, suggest environmental historians, these twin fault lines of progress were inextricably linked by powerful forces that caused as much ecological and cultural violence as they did progress toward bettering humanity. Settling on rugged terrain depended on new technologies capable of exploiting and shipping to market the fruits of rivers, forests, mountainsides, and prairies. Hence, in the nineteenth century, the largely inhospitable terrain of the West—by way of Thomas Jefferson's “agrarian ideal,” the ethic of Manifest Destiny, the Enlightenment's writers and painters, and the wide-eyed rhetoric of boosters—became a mythic garden of plenty in the minds' eyes of surveyors, pioneers, riverboat operators, cowboys, rail workers, gold diggers, freed blacks, and foreign immigrants, who settled the frontier in the hopes of bettering themselves.⁴ Despite new machinery and successive attempts to reinvent the western frontier, however, economic prosperity proved unsustainable for most farmers, blue-collar Americans, and minorities, the latter of whom eventually suffered the brunt of twentieth-century industrialization's environmental devastation.

As early as 1893, in the “The Significance of the Frontier in American History,” Frederick Jackson Turner looked to points of contact between savagery and civilization as forming the bedrock of American ethos. The West's lack of formal institutions, argued Turner, forced settlers and would-be lawmakers to reconceive of basic rules governing justice, religion, commerce, education, and other facets of the burgeoning frontier culture. As the influence of these reinvented institutions crept eastward, the whole of the nation's character was affected.

⁴ Merchant, *The Columbia Guide*, 60.

Critics have since questioned Turner's rigid distinctions between "savagery" and "civilization," pointing out that early western brothels and mining camps were anything but civilized. But Elliot West—in later enumerating characteristics that came to define the late eighteenth-century Trans-Appalachian Frontier, such as ethnic diversity, intricate power relationships among Indians and Euro-Americans, and an immense diversity of natural resources—agrees with Turner in that the West became nationalistically significant and unwaveringly American.

Despite a number of political realignments throughout the late eighteenth century that stilted settlement of the Trans-Appalachian frontier, a subsistence culture of small farms and go-it-alone trappers emerged by the turn of the century.⁵ British victory in the French and Indian War relegated management of large swathes of western territory south of Quebec to the Crown, which in 1763 promptly restricted frontier trade and outlawed all Euro-American settlement west of the Appalachian Mountains, in order to avoid costly clashes with Natives. But American colonists tired of crowded coastal townships continued to push west, complicating Britain's defense of the border region and sparking war with the Creeks and other tribes in the 1770s. Shortly thereafter, the Crown attempted to ally itself with Indians against the colonists during the Revolutionary War, but ultimately lost official control of all territory south of the Great Lakes and the St. Lawrence River and east of the Mississippi. American frontiersmen, left to fend for themselves in a common land devoid of any meaningful government authority, established a modest but sustainable inland economy based on both European and Native subsistence practices. "After clearing a small patch in the woods, perhaps two to five acres, farmers typically used it two or three years for crops and then five to eight years for pasture before allowing it to revert to woodland," explains historian Carolyn Merchant. Pigs and cattle grazed in forests and replenished fallow fields with nutrients, while farmers and housewives exchanged

⁵ Merchant, *The Columbia Guide*, 59.

crops, cheese, eggs, vegetables, preserves, and handicrafts for tools, shoes, bricks, or labor in lieu of cash. Families consumed one or two acres of woodland a year for fuel, eventually working “a 40-acre woodlot that would reforest itself over a period of 20 to 30 years.”⁶ On the eve of the Industrial Revolution, by blending European heritage with expertise from Indians with whom they traded and fought, early nineteenth-century Appalachian Americans achieved a rare measure of ecological harmony.

Such organic relationships with nature—rooted in Old World cosmologies linking all things in chains of being woven by an omnipotent creator—came to be lauded by transcendentalist writers of the period such as Henry David Thoreau, who in sum “wished to live lightly on the land.” Thoreau’s rural beanfield at Walden Pond, for instance, “exemplified his desire to save and restore nature by infusing subsistence farming with an ethic of preservation.”⁷ However, Thoreau’s masterful *Walden* (1854), Ralph Waldo Emerson’s *Nature* (1836), and James Fenimore Cooper’s popular Leatherstocking novels of the early nineteenth century—like the works of Thomas Cole and other Hudson River School painters—presented conflicted thinking about the natural realm. Their Romantic doctrine cherished the sublimity of the mountainous peaks and untamed waters of the backcountry and demonized the encroachment of cities—while simultaneously preferring, says Merchant, “a middle ground, the cultivated garden, as prefigured in Crèvecoeur’s *Letters from an American Farmer*.”⁸ Whereas Emerson contended that the earth ought to be appreciated as part of creation destined to serve man, the frantic pace of development on the frontier and the growing influence of Trachtenberg’s mechanistic perspective on society much vexed Thoreau and other declensionists.

⁶ Merchant, *The Columbia Guide*, 61.

⁷ Merchant, *The Columbia Guide*, 71.

⁸ Merchant, *The Columbia Guide*, 69.

The Land Ordinance of 1785 constituted a massive surveying project that eventually set in motion the parceling of acreage across the entire contiguous United States. Federal agents divided terrain west of the Appalachian Mountains into 36-square-mile townships. One square mile of land amounted to 640 acres, or “one section of land,” which were auctioned to primarily wealthy buyers at no less than one dollar per acre. Thus the Ordinance achieved the government’s twin aims of generating revenue and rewarding those elites who had supported the Revolution. An additional ordinance in 1787 provided statutory guidance on administering western land use and allowing settlements to become territories and states, contradicting, in part, the Ordinance of 1785, which required deals be struck with Indians before settlement progressed.

In a nation obsessed with the Enlightenment’s proclivity for reason and symmetry, the parceling of lands enabled Americans to bring order and sense to what many perceived as a chaotic and perilous wilderness. In retrospect, point out environmental historians, what the new grid presupposed was unending growth on the western horizon, and the uniform annexation and usage of lands characterized by wildly diverse ecologies and native peoples. Despite intermittent conflicts with tribes of northern Kentucky and Ohio in the late eighteenth century, a demographic wave of settlement lurched west; more whites passed down the Ohio River every month in 1788 than the total number of the Shawnee tribe. The Harrison Land Act of 1800 reduced allowable purchases to 320-acre half-sections—still beyond the reach of many Americans—but pioneering families of modest means bought smaller pieces of farmland from wealthy entrepreneurs and railroad companies. The Louisiana Purchase of 1803 secured territory west of the Mississippi and east of the Rocky Mountains from French control, and effectively doubled the amount of land the U.S. government could deed to its citizenry.⁹

⁹ Merchant, *The Columbia Guide*, 80.

Meanwhile, the first stirrings of the Industrial Revolution could be felt in New England, where in the early nineteenth a cultural transformation took place that deemphasized President Jefferson's "agrarian ideal"—the celebration of yeoman farming as the nation's quintessential livelihood—and prompted the growth of a new inland economy that depended on linking the underdeveloped interior to urban markets in Philadelphia, Boston, New York and other coastal settlements. Ocean port cities were the first to pursue public works projects that would eventually serve as the cornerstone of American commerce. During the eighteenth and early nineteenth centuries, local merchants with common economic interests pooled their capital in order to construct piers, docks, wharves, and cobbled streets. In cities that lacked strong central planning, such piecemeal improvements resulted in disjointed networks of public roadways that nevertheless attracted innkeepers, sailmakers, carpenters, and blacksmiths, as well as related institutions such as churches, banks and customs houses. Still, inland commerce remained limited to the movement of goods on river systems below the fall line, leaving many townships and farms disconnected from urban markets. Cost efficiency, reasoned farmers, prohibited wagonloads of crops or other commodities from traveling more than forty or fifty miles to reach water.

At the turn of the century, with the discovery of coal and the distribution of fresh farmland in the interior, Americans began clamoring for more "internal improvements" such as new roads and canals. The federal government, however, under the leadership of President Jefferson, a principled constructionist, felt restricted by the Constitution, which did not grant outright authority to finance public works. Eventually siding with what became known as the Doctrine of Implied Powers, Jefferson justified the building of roads and canals with public dollars by citing the Constitution's "necessary and proper" clause, which allowed the

government to expand its powers in order to protect those already enumerated in the Constitution. Jefferson also felt that by getting the government into the transportation business early, he would be able to squash monopolies which operated on rivers and in private canals—a sentiment affirmed in the U.S. Supreme Court’s *Gibbons v. Ogden* decision of 1824.

That same year, another massive surveying project—the General Survey Act—outlined plans for a host of federally funded transportation projects, chief among them canals. Raising revenue from new canals was of secondary concern to public works officials, who assumed optimistically that development would follow their lead. Soon private and public waterways began, as it were, to shrink the nation. In 1825 the Great Lakes were connected with New York City via the Erie Canal, shortening the twenty day journey from Buffalo to Albany to just eight days. Moreover, one horse pulling a laden canal barge could leverage as much power as fifty mules pulling the load overland. Two years later, the public Illinois-Michigan canal reached completion, linking Lake Michigan with the Mississippi River and paralleling the unnavigable Illinois River. Even though canal investors waited years for returns on their investment, the dredged, manmade channels were relatively cheap to maintain compared to roads. The simultaneous advent of steamboats, which became fixtures of the Mississippi, Missouri, and Ohio rivers and voracious consumer of wood fuel, also hastened the flow of inland commerce, so that both industrial and agricultural business sectors flourished in the early nineteenth century.

For a time, as a result of the waterborne economic boom, America’s skilled laborers earned nearly three times that of their European counterparts, paid less for food, farm tools, and other commodities, and generally enjoyed healthier lives despite rampant alcoholism. The growth of Waltham-Lowell textile mills along the Merrimack and Charles rivers in early nineteenth-century Massachusetts also lowered the price of clothing, helped in part by a new

“putting out” system whereby semi-finished products such as yarn were sent to homes for assemblage by women, who later came to live and work in dormitories that sprang up alongside manufacturing plants. Paddle-driven, softwood timber mills also performed the work of what twenty people could do with hand tools, but often closed once local forests gave out. As the banks of rivers such as the Charles became crowded with dozens of mills seeking to harness the water’s power, and networks of canals siphoned away water for agriculture, competition for what became a dwindling commodity increased.

Early notions of “water rights” emerged in the 1820s and 30s, followed by dam-related volume shortages in the 1840s that adversely affected loggers and ferry operators. Judges developed “reasonable use” tests for determining whether claimants had the right to withhold water from downstream users and “eminent domain” justifications for seizing property in the name of new dam construction. Meanwhile, stocks of salmon and alewives suffered as the fish struggled to reach inland spawning grounds. Ultimately, the courts tended to favor industrial water users, so that industrial pollution generated by factories and as well as municipal sewage channeled into rivers became a serious problem by the late nineteenth century. An outbreak of typhoid fever linked to human waste in two Massachusetts mill towns in the 1890s may have claimed more than a third of the population. Gradually, riverine communities came to realize the reluctance with which free market capitalism responded to environmental crises affecting their quality of life.

Just as waterways became a central piston in the machinations of the early Industrial Revolution, the discovery of gold on the American River in the Sierra Nevadas on January 19, 1848, would a year later permanently recast Trachtenberg’s mythological West. Within a matter of months, tens of thousands of would-be miners were frantically streaming west, hoping to

strike it rich before deposits ran dry. Some booked passage around Cape Horn on merchant vessels bound for California and the Orient, others crossed humid, malaria-ridden Panama and continued north by boat, but most sought out California via overland trails. If they succeeded in arriving, exhausted and often penniless, forty-niners then set about locating unclaimed placers and veins, setting up camp on borrowed money, and beginning the grueling work of mineral mining.

Merchant details the lengths to which miners went to extract mere flakes of gold from the earth: “The area known as the Mother Lode in the western Sierra foothills was noted not only for the early process of gold panning, in which prospectors employed pans, cradles, and sluice boxes to wash and separate out the heavy gold particles from the sand and gravel, but also for river mining, hydraulic mining, hard rock mining, and dredging.”¹⁰ Select placer miners realized their dreams and took in \$8,000 per day, but such streams usually “played out” after a year and a half, leaving less privileged miners—especially freed blacks and Chinese arriving from the Far East—to pick over “tailings” piles of discarded rock, or go to work for more wealthy miners at low wages. Each method of extraction had unique and often devastating environmental impacts. The introduction of hydraulic mining in 1852, for instance, involved the use of giant hoses or “monitors” pressurized by gravity that were capable of washing away whole hillsides. Gold nuggets were collected in chains of sluice boxes, while “debris flowed down to the valleys below...covered acres of farmland, filled the beds of streams, created shoals in the rivers and bays, and halted tidal action in the cities of Marysville and Sacramento.” The practice was banned by the Ninth Circuit Court’s Judge Lorenzo Sawyer in 1884, but not before serious harm had been done to local communities and ecosystems.¹¹

¹⁰ Merchant, *The Columbia Guide*, 83.

¹¹ Merchant, *The Columbia Guide*, 86.

The spread of steam-powered trains across the American continent coincided with the rise of western lore surrounding the Gold Rush, but also typified nineteenth-century society's mechanistic fetishism. "Railroads cut deep scars through the landscape and made heavy demands on forests and mines for firewood, timber, coal, and iron," explains Merchant.¹² With shipping controlled by steamboats and expensive overland stagecoaches operated by Wells Fargo and American Express, and with company mining towns and farmers in constant need of supplies from the East, the demand for reduced prices and interior railroads became acute. After much debate, Sacramento, while being inundated with erosion from hydraulic mining, became in 1861 the Pacific terminus for the nation's first transcontinental railroad, running west from Omaha under the direction of the Pacific Railroad Act. Two companies—Central Pacific of Sacramento and Union Pacific of Omaha—raced against the clock to lay down tracks extending inland from each city, eventually meeting in Utah. Both companies received land grants extending 800 feet on either side of the tracks, and as much as six miles in some areas, in effect a massive government subsidy. In addition to consuming timber and coal for propulsion, subsequent rail lines such as the Southern Pacific, the Santa Fe, the Northern Pacific, and the Great Northern "contaminated their routes with noise, smoke, ashes, and threats of fire," while simultaneously giving rise to hundreds of frontier towns that served as supply depots.¹³

In myth and symbol, the settlement of the West depended as much on the locomotive, an industrial beast of burden, as it did on oxen, mules, cattle, and other animals of agrarian enterprise. Oxen—massive bovines originally bred in Germany and available at lower prices than mules—could eat a wider variety of wild plants that grew along frontier trails, while mule teams were capable of negotiating more treacherous terrain. Both animals hauled wagons,

¹² Merchant, *The Columbia Guide*, 67.

¹³ Merchant, *The Columbia Guide*, 67.

dragged timber and plows, and occasionally even provided food to starving settlers long before rail lines began crisscrossing the continent. Arguably the most emblematic domesticated animal of the West, however, were the millions of cattle driven across open ranges in Texas and the Great Plains to new railheads in Wyoming, Kansas, and Nebraska in the 1870s and 80s for shipment to eastern markets, where beef became popular across a wide swath of American society. Between 1882 and 1886, Cheyenne saw a hundred new cattle operators open for business as a direct result of railroad construction. Groups of investors known as cattlemen's associations developed branding systems and strictly controlled the wages of the fabled cowboys, most of whom were low-paid Mexicans by the 1880s. Droughts, market panics, and farming spelled the end of the cattle drives by late 1880s, as well as the introduction of barbed wire that hemmed in the open range. A grueling 1886-1887 winter also leveled millions of head of cattle, and likely jaded even the most stoic of cowboys forced to see so many carcasses scattered across the Plains.

The farming of the Great Plains followed years of moderately successful agricultural production in Oregon's fertile Willamette Valley and surrounding areas from the 1840s onward. With the passage of the Homestead Act in 1863, however, a fresh wave of Plains settlers claimed titles to 160-acre parcels of land, launching an American saga vividly recounted in the memoirs of frontier woman Laura Ingels Wilder. In contextualizing the settlement of the West as a grand narrative of American progress, Merchant and environmental historian William Cronon suggest that "A hostile environment, initially conceptualized as a Great American desert, was gradually brought under control and transformed into a garden, making the Great Plains a Garden of the World."¹⁴ Plains scholar Walter Prescott Webb posits six technologies that attempted to bring about this transformation: the Colt six-shooter, barbed wire, the windmill, the John Deere plow,

¹⁴ Merchant, *The Columbia Guide*, 89.

the railroad, and the mechanized harvester. From “the mid-nineteenth century to the present,” argues Merchant, “many cowboys and settlers successfully ranged, homesteaded, and gradually urbanized the Plains.”¹⁵

However, not all who came west were quite so fortunate. State immigration boards, chambers of commerce, newspaper editors, and railroad operators often engaged in “boosterism”—the hawking of questionably fertile, even barren farmland in brochures and advertisements in order to attract enterprising farmers. Although the introduction of horse-drawn mowers, combines, and seed drills reduced the human labor required to produce wheat and corn in a given growing season, the persistently harsh Plains climate made sustainable farming a difficult proposition. Wood for shelter and fencing was scarce, and as annual rainfall fell below twelve inches per year in areas closer to the Rocky Mountains, even hardy winter wheat sometimes withered and died. The introduction of Hardy Webster Campbell’s “dry farming” or “scientific farming” in the 1870s and 80s helped farmers raise annual crops in arid regions by leaving some fields fallow and vegetation-free for a full year, allowing the ground to absorb available moisture. Still, decade-long droughts meant financial ruin for even the most resilient farmers, most notably the disastrous Dust Bowl of the 1930s.¹⁶ According to historian Donald Worster, “the Dust Bowl derived from a 30-year history of monocultures that depleted the prairie grasslands of fertility, eroded the topsoil, and evaded the rainfall limits imposed by nature on the region.”¹⁷

By the late nineteenth century, the Industrial Revolution had produced dramatic improvements in productivity across both the nation’s agricultural and manufacturing sectors—at the expense of fouling the air, water, and soils of North America with byproducts such as

¹⁵ Merchant, *The Columbia Guide*, 93-94.

¹⁶ Merchant, *The Columbia Guide*, 96.

¹⁷ Merchant, *The Columbia Guide*, 97.

sulphur, cyanide, mercury, and ammonia gas, to name a few. In urban areas that grew increasingly crowded, however, such pollutants were hardly recognized as dangerous. Instead, cities measured their self-worth in terms of the amount of coal smoke that hung in the air—a sign of progress, the overriding priority of the day. At the turn of the century, Pittsburgh boasted some 14,000 smokestacks. Coupled with inadequate sewer systems, crowded living conditions, and contaminated water supplies, air pollution and other hazardous environs led to rampant typhoid fever, cholera, and long term respiratory diseases. Ironically, the Industrial Revolution's side effects so compromised the nineteenth century's quality of life that by proper accounting, America's gross national product was probably significantly retarded.

Among those who have suffered most from the combined effects of land, air, noise, and water pollution have been the nation's minorities. In "Steps to an Ecology of Justice: Women's Environmental Networks across the Santa Cruz River Watershed," environmental feminist Giovanna Di Chiro profiles the activism of one humble but stalwart crusader for ecological justice, Rosa Marie Augustine, who typifies modern day victims of industrialization, specifically the military-industrial complex of south-central Arizona, where a number of defense contractors have polluted desert washes and underground aquifers for decades. "Since the 1940s," writes Di Chiro, "these waterways steadfastly carried the toxic-laden water northwest to the Santa Cruz River, and ultimately, to the numerous municipal wells that served the low-income and 85 percent Hispanic neighborhoods of South Tucson, including the house of Rose Augustine and family."¹⁸ Such "environmental racism," as Di Chiro terms the negligence that likely caused cancers, heart disorders, and muscular dystrophy among Augustine's relatives and community, has only recently emerged as an object of study within the environmental history field, but

¹⁸ Giovanna Di Chiro, "Steps to an Ecology of Justice: Women's Environmental Networks across the Santa Cruz River Watershed," in *Seeing Nature through Gender*, Virginia Scharff, ed. (Lawrence: University Press of Kansas, 2003), 290.

deserves further attention in the context of evaluating the Industrial Revolution's continuing repercussions for local ecologies and peoples, especially those caught between borders.

In retrospect, however unsteady the yields of Trans-Appalachian subsistence farming, Northeast riverine economies, California gold mining, the construction of western railroads, Texas cattle drives, and Great Plains agriculture—confluences of both Jefferson's "agrarian ideal" as well as the dawning of industrial capitalism in America—the nineteenth century development of the West seems invariably tied to technologies and markets flowing from large cities. Those urban spaces, in turn, depended on large scale farms and unsustainable monocultures, a freakish manifestation of Crèvecoeur's cultivated garden, to provide foodstuffs for populations suffering from rising levels of pollution. Considering the Industrial Revolution's ultimate failure to increase productivity while simultaneously upholding standards of living for workers laboring in its factories, one must conclude that Trachtenberg's "single picture of a progressive civilization fulfilling a providential mission" can only represent a national mirage that failed to materialize. "In a 'real democracy,'" asserts Rose Augustine, "the government would not 'protect industries, but the people.'"¹⁹

¹⁹ Di Chiro, "Steps to an Ecology," 303.